PATENT
Docket No.: P1D1C1-US

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Patti Crowder

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#29/Pet Amdt F
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7/25/01

In the application of: Khandros

Application No.: 09/245,499

Filing Date: February 5, 1999

For: AN ELECTRONIC ASSEMBLY HAVING A SUBSTRATE WITH A PLURALITY OF TERMINALS, AND A PLURALITY OF ELONGATE SPRINGABLE INTERCONNECTION ELEMENTS CONNECTED TO THE TERMINALS

Examiner: K. Cuneo

Group Art Unit: 2841

7/25/01

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the final Office Action dated March 28, 2001, Applicant files herewith a Request For Continued Examination of the above-identified patent application. Prior to continued examination of the application, please amend the application as follows:

IN THE CLAIMS:

Please cancel claims 113, 114, and 117-122 without prejudice.

Please amend as necessary claims 115, 116, and 123-131 to read as follows:

115. (Twice Amended) An electronic assembly comprising:

a substrate having a plurality of electrically conductive terminals; and

a plurality of resilient, springable, free-standing interconnection elements, each of the interconnection elements having an end attached directly to a respective one of the terminals on the substrate, an elongate section between the attached end and a contact end, and a tip on the contact end, the tip pointing away from the substrate, wherein the interconnection elements include a precursor element and an overcoat material covering said precursor element, the precursor element is of a flexible, substantially non-resilient material and the overcoat material provides the resilient springability of the interconnection element.

116. The electronic assembly of claim 115 wherein the precursor element includes a material selected from the group of gold, aluminum and copper, and the overcoat material includes material selected from the group of nickel, cobalt and iron.

123. (Amended) An electronic assembly comprising:

a substrate having a plurality of electrically conductive terminals; and

a plurality of resilient, springable, free-standing interconnection elements, each of the interconnection elements including a precursor element of a flexible, non-resilient material and an overcoat material covering said precursor element, the overcoat material providing the resilient springability of the interconnection element, and having

an end attached directly to a respective one of the terminals on the substrate,

an elongate section extending from the attached end to a contact end, the elongate section including at least a first bend and a second bend, and

a tip on the contact end, the tip pointing away from the substrate.

124. (Amended) An electronic assembly comprising:

a substrate having a plurality of electrically conductive terminals; and

a plurality of resilient, springable, free-standing interconnection elements, each of the interconnection elements having an end attached directly to a respective one of the terminals on the substrate, an elongate section between the attached end and a contact end, and a tip on the contact end, wherein the interconnection elements include a precursor element and an overcoat material covering said precursor element, the precursor element is of a flexible, substantially non-resilient material and the overcoat material provides the resilient springability of the interconnection element.

125. The electronic assembly of claim 124 wherein the precursor element includes a material selected from the group of gold, aluminum and copper, and the overcoat material includes material selected from the group of nickel, cobalt and iron.

126. The electronic assembly of claim 124 wherein the elongate section includes at least one bend.

127. (Amended) The electronic assembly of claim 126 wherein the elongate section includes a proximate portion extending from said substrate end at an angle away from the substrate, a mid-portion extending at an angle from said proximate portion, and a distal portion extending at an angle from said mid-portion and away from the substrate.

128. (Amended) The electronic assembly of claim 127 wherein the proximate portion extends from the substrate end at an angle substantially perpendicular to the substrate.

129. The electronic assembly of claim 124 wherein the tip has a contact region which provides a releasable point contact.

130. (Amended) The electronic assembly of claim 129 wherein the contact end is moveable toward the surface of the substrate upon the application of a downward pressure upon the tip.

131. (Amended) The electronic assembly of claim 124 wherein the assembly further comprises a second substrate having a plurality of contacts, and at least one of the interconnection elements conducts electricity when the tip of the interconnection element is in releasable contact with a respective contact on the second substrate.

REMARKS

Claims 113, 114, and 117-122 have been cancelled without prejudice, and claims 115, 123, 124, 127, 128, 130, and 131 have been amended. Claims 115, 116, and 123-131 are now pending in the application. In addition, Applicant submits herewith proposed drawing corrections marked in red, and ask the Examiner to approve the proposed drawing changes. Applicant also submits an Information Disclosure Statement (IDS). Applicant respectfully requests reexamination and reconsideration of the application as amended.

Turning first to the drawings, three objections were made to the drawings: (1) improper cross-hatching, (2) lack of a Prior Art label, and (3) claimed embodiment not shown in Figures 18, 19, and 21, which correspond to the elected species.

Applicant submits herewith proposed drawing changes to address items (1) and (2) above. More specifically, the proposed changes add the label "Prior Art" to Figure 1A, addressing item (2) above, and change cross hatching in each of the figures (Figures 1a through 21), addressing item (1) above. Please note that the exemplary substrate 10 in each of the figures has been cross-hatched as a semiconductor material. This is because the specification discloses that the substrate 10 may be selected from many different types of materials, including without limitation a material forming an interconnection substrate, ***a semiconductor device***, a semiconductor package, a passive electronic device, etc. *See* the specification, pg. 36, lines 3-17. Thus, the substrate 10 may be one or more of many different types of materials including without limitation a semiconductor material or an insulative material.

To be consistent with issued U.S. Patent No. 5,852,871 (issued December 29, 1998) and U.S. Patent No. 6,049,976 (issued April 18, 2000), both of which are sibling applications to the instant application (the disclosures of the '871 patent, the '976 patent, and the instant application are identical and all claim priority ultimately to application serial no. 152,812, now U.S. Patent No. 5,476,211), the substrate 10 is illustrated as a semiconductor material in the proposed drawing changes, although this should not be taken as limiting the type of material the substrate 10 may be made of. It

should be noted that the enclosed drawing changes were accepted during prosecution of the above-mentioned '871 and '976 patents. Therefore, Applicant asserts that the proposed drawing changes overcome objections (1) and (2) above.

To address objection (3) above, Applicant has broadened claims 115, 116, and 123-131 to allow the resilient interconnection elements to be attached to terminals on a "substrate," which of course may include but is not limited to a "semiconductor die." This, it is believed, addresses the Examiner's concern that the claims did not read on the exemplary embodiments shown in Figures 18, 19, and 21, which correspond to the elected species in this application. (Thus, the amendments made to claims 115, 116, and 123-131 are not made for patentability purposes.)

As is known in the field and taught in the specification, a "substrate" may include a semiconductor package or an interposer as illustrated in Figures 18, 19, and 21. Therefore, the claims as amended read on the exemplary embodiments shown in Figures 18, 19, and 21 (the elected species).

It should be noted that the claims as amended are now generic to all of the embodiments of the invention illustrated in the specification. For example, a "substrate" may also include a semiconductor package as illustrated in Figure 20 (which corresponds to the nonelected species). As known in the field and disclosed in the specification, a "substrate" may also include many other disclosed embodiments (species) of the invention not identified in the Restriction requirement dated 8/30/1999, which include without limitation "substrates" that form all or part of an interconnection device, a semiconductor device, an electronic component, an electronic device, a semiconductor package, and a passive electronic device. *See, e.g.,* the specification, pg. 36, lines 3-17; and Figures 1b through 21. Therefore, the claims as amended are generic to all of the disclosed embodiments (whether identified in the 8/30/1999 Restriction requirement or not) and fully illustrated by the figures illustrating the elected species (Figures 18, 19, and 20) as well as figures illustrating other embodiments (species) of the invention. Therefore, the amendments to claims 115, 116, and 123-131 overcome the third objection to the drawings.

Applicant acknowledges with appreciation the Examiner's indication that claims 115, 116, and 123-131 are allowable. Applicant believes that these claims remain allowable over the prior art at least due to the requirement that the resilient interconnection elements comprise a layered structure in which the overcoat provides the resiliency. Moreover, the proposed amendments moot the rejection of claims 113, 114, and 117-122 by canceling those claims without prejudicing Applicant's right to pursue these claims in a continuation application. Therefore, Applicant asserts that the application is in condition for allowance.

Although Applicant believes no fee is required in connection with the filing of this Preliminary Amendment, Applicant authorizes the Commissioner to charge any fee that may be due in connection with the filing of this paper to Deposit Account No. 50-0285 (order no. P1D1C1-US).

Respectfully submitted,

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